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Collagen type I extracted at room temperature and low-speed centrifugation for wound healing application

Ferreiro, O.(1); Monteiro, M.(2); Candido, J.G.(3);
(1) UNA; (2) FPUNA; (3) FCQUNA;

Nile tilapia is one of the most produced fish in Paraguay, which generates a high percentage of waste or by-products, such as scales, fins, and skins. On the other hand, type I collagen is a biomaterial of great importance and has vast applications for the pharmaceutical and food industries and tissue engineering. Within this context, this work aims to describe an acid extraction route for type I collagen from Nile tilapia skin at room temperature and low-speed centrifugation for its use in wound healing applications. An inverse proportion was observed between the dry weight yield and the acetic acid concentration. The morphology of the extracted collagen presented a characteristic structure with randomly interconnected filaments and wrinkled and porous surface morphology, adequate for cell adhesion, proliferation, and migration. FTIR analysis showed bands of amides A, B, I, II, and III, which are characteristics of collagen. The amide III/pyrrolidine rings ratio is approximately equal to 1, which showed that centrifugation at room temperature did not break the tropocollagen structure to form gelatin, indicating that the triple helix structure remained intact after extraction. The electrophoresis results indicated that the ?1 chain band is approximately twice larger than the ?2 chain for the denatured condition, suggesting that the extracted collagen corresponds to type I collagen. These results indicate that it is possible to extract good-quality type I collagen from Nile tilapia skin at room temperature and low-speed centrifugation for wound healing application.